

**A NEW APHID SPECIES, *CINARA RADICIVORA*  
(HOMOPTERA: APHIDIDAE), LIVING ON WHITE FIR**

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The new species of *Cinara* described below was discovered during a study of *Camponotus* spp. in the Giant Forest area of Sequoia National Park, California. It was found feeding at the root crown on old growth white fir (*Abies concolor* (Gord.) Lindl. ex Hildebr.).

***Cinara radivora* Voegtlin, new species  
(Figs. 1, 2)**

*Apterous viviparous females.*—Color of living specimens: Entire body shiny, dark green-black with scattered irregular patches of brown on dorsum of abdomen. Appendages concolorous with body except for lighter areas as follows: on antennae, proximal  $\frac{3}{4}$  of III,  $\frac{1}{2}$  of IV and  $\frac{1}{4}$  of V; on legs, femora lightening gradually on proximal  $\frac{1}{2}$  and proximal  $\frac{1}{3}$  of tibiae becoming gradually lighter.

Color of mounted specimens: Degree of darkness of sclerotized areas quite variable between specimens. In general dorsal sclerites lighter brown, lighter than cauda, anal plate, subgenital plate and legs which vary from light to dark brown. The sclerotization pattern is as follows: head, pro- and mesonotum evenly sclerotic with paired, irregularly shaped, membranous patches spinally on mesonotum (Fig. 2). Rest of dorsum membranous except for paired sclerites on metanotum, and on abdominal tergites I and VIII. Some specimens with a few sclerites on tergites VI and VII. Antennae concolorous with head except as noted in living specimens. Extent of light areas on femora and tibiae highly variable: both can be almost entirely pale except for joint areas, or in some specimens, only proximal  $\frac{1}{3}$  is pale with remainder quite dark.

*Measurements (mm).*—Length of body, 4.4–6.1. Length of rostrum, 2.9–3.8; ultimate rostral segment, 0.43–0.56. Antennal segments: III, 0.76–0.90; IV, 0.31–0.46; V, 0.39–0.55; VI base, 0.20–0.25; process terminalis, 0.05–0.08. Metatibiae, 2.6–3.2; tarsal I, 0.13–0.15; tarsal II, 0.36–0.46. Diameter of base of siphuncular cone, 0.31–0.59. Length of setae: on tergite V, 0.13–0.18; on tergite VIII, 0.15–0.23; longest on antennal III, 0.10–0.16; longest dorsal surface mid-metatibiae, 0.09–0.14.

*Morphology.*—Sensoria on antennae: III, 0; IV, 0–2; V, 0–3. No meso-

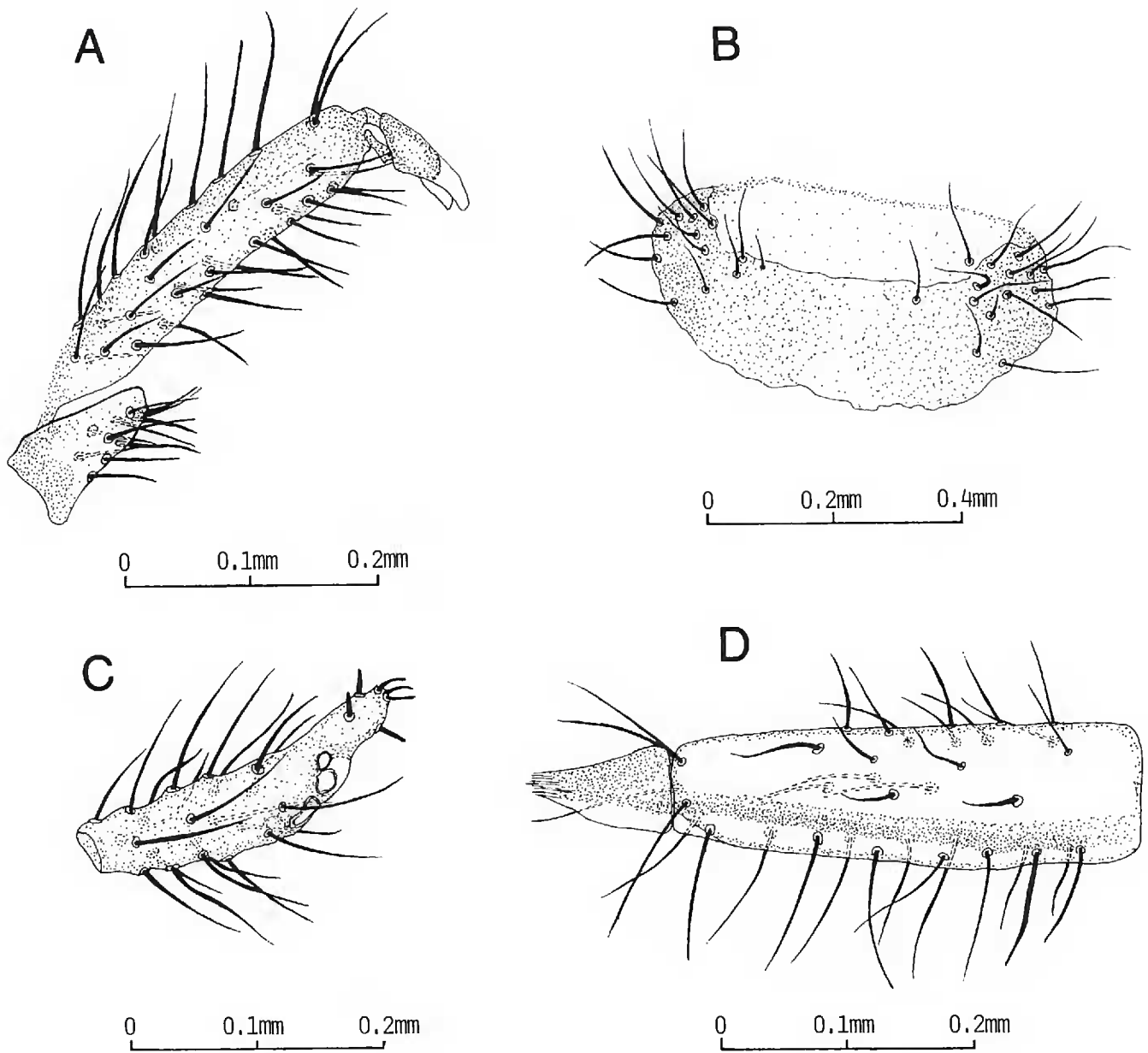


Fig. 1. *Cinara radicivora*, new species. A, First and second metatarsi; B, Subgenital plate (Drawn from Holotype); C, Antennal VI; D, Ultimate rostral segment showing accessory setae.

sternal tubercle. Siphuncular cones with irregular anterior and often posterior edges. Setae on siphunculi evenly scattered, dense (80–160) and gradually decreasing in length and basal diameter towards top of cone. Subgenital plate with 29–56 setae distributed as in Figure 1B. Ultimate rostral segment with 26–54 accessory setae, those not aligned on either side of the stylet groove are scattered about segment (Fig. 1D). Antennal setae: II, 25–41; VI base, 19–33; process terminalis, 3–4 (Fig. 1C). Tergite V with 175–200 setae and tergite VIII with 58–90 setae.

*Alate viviparous females.*—Color of living specimens: Head and thorax black, abdomen dark green-black. Legs dark throughout except for proximal  $\frac{1}{3}$  of femora. Antennal II and proximal areas of III, IV and V light, remainder black.

Color of mounted specimens: Head and prothorax medium amber, ptero-

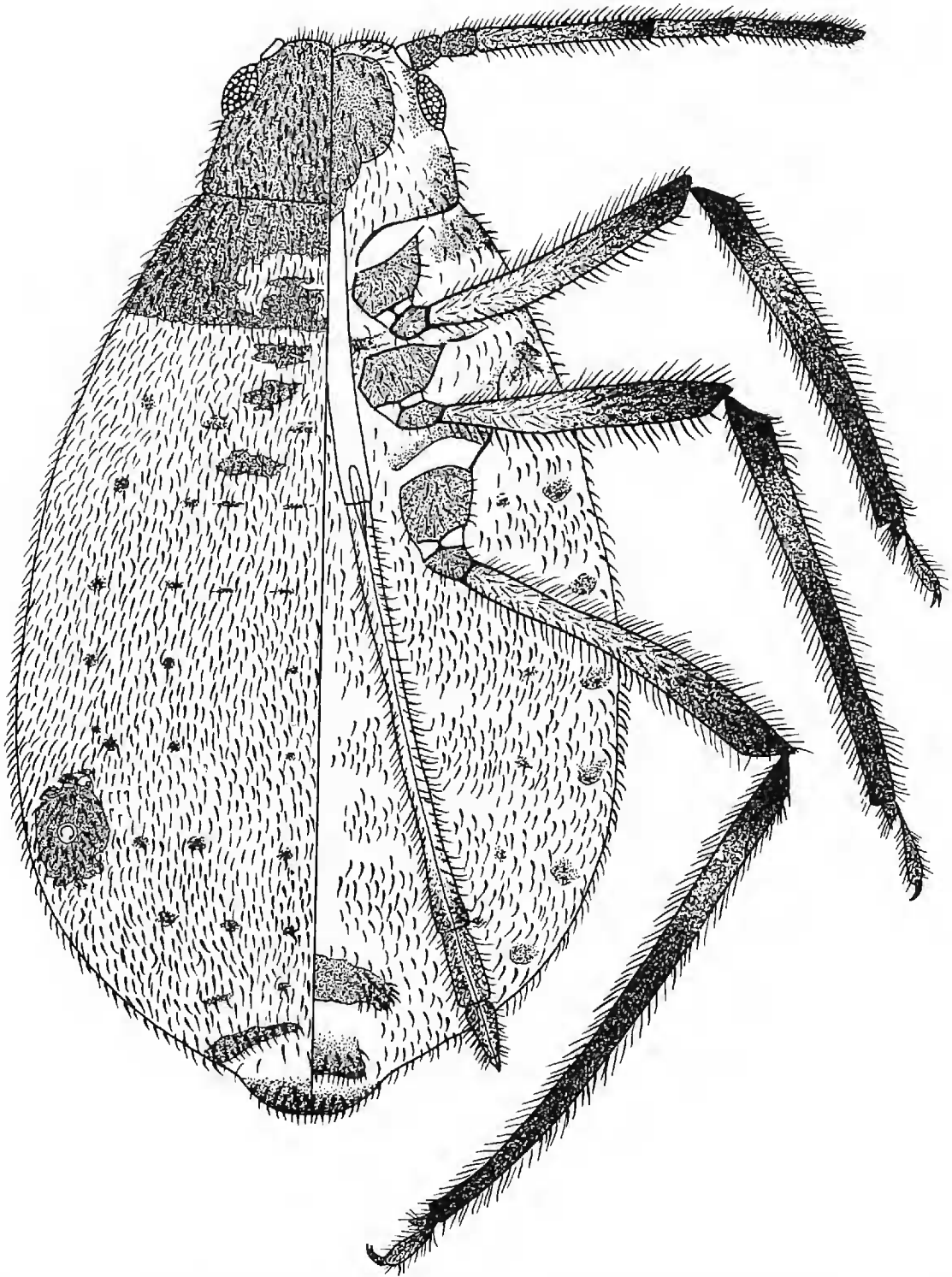


Fig. 2. *Cinara radicivora*, new species. Apterous viviparous female. Drawing by Donna Baron.

thorax dark brown. Abdomen membranous except for paired sclerites on tergite VIII. Legs and antennae patterned as in life. Siphunculi medium brown.

*Measurements (mm).*—Length of body, 4.1–6.1. Length of rostrum, 3.2–3.9; ultimate rostral segment, 0.51–0.57. Antennal segments: III, 0.83–1.05; IV, 0.41–0.51; V, 0.53–0.65; VI base, 0.24–0.29; process terminalis, 0.06–0.08. Metatibiae, 3.0–4.1; tarsal I, 0.14–0.16; tarsal II, 0.42–0.51. Diameter

of base of siphuncular cone, 0.30–0.65. Length of setae: tergite V, 0.09–0.18; tergite VIII, 0.13–0.23; longest on antennal III, 0.12–0.16; longest dorsal surface mid-metataibiae, 0.13–0.19.

*Morphology.*—Secondary sensoria on antennal III, 1–5; IV, 2–5; V, 1–3. Siphuncular cones with irregular anterior and often posterior edge. Setae on siphunculi evenly distributed, dense (110–140) and gradually decreasing in length and basal diameter towards top of cone. Subgenital plate shaped much as in apterae (Fig. 1B) but in some specimens narrower and longer, with from 50–78 setae distributed as in apterae. Ultimate rostral segment with 52–67 accessory setae, those not aligned along stylet groove are scattered about segment. Antennal setae: II, 39–50; base VI, 30–40; process terminalis, 4. Tergite V with 160–200 setae; tergite VIII with 53–80 setae.

*Other forms.*—No males, oviparae or fundatrices have been collected for this species.

*Types.*—Holotype, apterous viviparous female on *Abies concolor*, Sequoia National Park, CALIFORNIA, 19-VI-1977, David Tilles, slide #356-1. Paratypes: Sequoia National Park, CALIFORNIA; 3 apterae, 19-VI-1977; 4 apterae, 21-VI-1977; 2 apterae, 1-VII-1977; 1 aptera, 14-VII-1977; 1 aptera and 2 alatae, 29-VII-1977; 2 alatae, 8-VIII-1977; 1 alata, 14-VIII-1977; 1 aptera and 1 alata, 15-VIII-1977, David Tilles. 19 apterae and 2 alatae, 11-VII-1979, Suzanne Paulaitis and David Voegtlin. Wildwood Camp, Ochoco National Forest, OREGON, 2 apterae, 16-VII-1977, David Voegtlin.

*Type locality.*—The Round Meadows area near Giant Forest in Sequoia National Park, California.

*Deposition of types.*—Holotype and paratypes deposited in the collection of the Illinois Natural History Survey. Other paratypes deposited in the collections of the United States National Museum of Natural History, British Museum (Natural History), Canadian National Collection, California Insect Survey, Berkeley, and D. Hille Ris Lambers.

*Diagnosis.*—Of the approximately 200 species of *Cinara* there are only six known with a rostrum of 3 mm or longer. All are associated with the trunk, root crown, or root of their host. They are not closely related and the elongate rostrum must have evolved independently in several species groups within the genus. The absolute length of the rostrum will separate *C. radicivora* from the majority of the *Cinara*. *C. radicivora* can be separated from the other 5 species with rostrum longer than 3 mm by the following key.

Key to Species of *Cinara* with Rostrum Longer than 3 mm

- 1(4). Dorsum of abdomen with very short setae (0.015 mm), each on a very small sclerite only slightly larger than the base of the setae.
- 2(3). Ultimate rostral segment 0.51–0.58 mm and with 22–30 acces-

- sory setae. Antennal segment IV distinctly longer than antennal segment II. With 80+ setae on the siphuncular cones. On *Pinus halepensis* Mill., on the bark. France. . . . .  
 . . . . . *C. balachowskyi* Ramaudière (1974)
- 3(2). Ultimate rostral segment 0.64–0.74 mm and with 90+ accessory setae. Antennal segment IV subequal to antennal segment II. With 29–40 setae on siphuncular cones. On *Pinus edulis* Engelm., below ground level. Colorado. . . . *C. puerca* Hottes (1954)
- 4(1). Dorsum of abdomen densely covered with rather long setae, the majority of which are not on sclerites.
- 5(6). With accessory setae on ultimate rostral segment in two rows along the stylet groove, total 16–20 accessory setae. Subgenital plate almost square in outline and densely covered with setae. Process terminalis with seven subapical setae. On *Picea glauca* (Moench) Voss, roots. Canada. . . . . *C. saskensis* Bradley (1962)
- 6(5). Accessory setae on the ultimate rostral segment always in more than the two rows along the stylet groove (Fig. 1D). More than 25 accessory setae. Subgenital plate variable, usually elongate oval (if it approximates a square then there are five or fewer subapical setae on the process terminalis).
- 7(8). Ultimate rostral segment long and narrow, always greater than 0.60 mm. Siphunculi small with fewer than 30 setae. On *Pinus thunbergiana* Franco and *P. densiflora* Siebold & Zucc., on lower trunk. Japan. . . . . *C. sorini* Inouye (1970)
- 8(7). Ultimate rostral segment less than 0.56 mm long. Siphuncular cones large and with 50 or more setae.
- 9(10). With a distinct mesosternal tubercle. Ultimate rostral segment 0.39–0.46 mm, with 22–26 accessory setae. Rostral length 2.4–3.5 mm. With less than 100 setae on the siphuncular cones. On *Pinus banksiana* Lamb., on roots. Canada. . . . .  
 . . . . . *C. piniradicis* Bradley in Bradley and Wighton (1959)
- 10(9). Without a distinct mesosternal tubercle. Ultimate rostral segment 0.43–0.56 mm, with 26–67 accessory setae. Rostral length 2.9–3.9 mm. With 80–160 setae on the siphuncular cones. On *Abies concolor*, root crown. California and Oregon. . . . . *C. radicivora*, new species

*Biological notes.*—This species is found beneath the ground level on the root crown of old growth *Abies concolor* and in all collections it has been attended by *Camponotus* spp. They are not easily collected as they are often located in cavities formed under the outer layers of the bark. These are probably naturally formed cavities but the shape and polished appearance of them suggests that the ants may have assisted in cavity formation or certainly were keeping the cavity free of debris.

### Acknowledgments

I would like to thank David Tilles who provided many of the specimens collected during his thesis research in Sequoia National Park. I would also like to thank Donna Baron for the drawing of the whole aphid and George Godfrey for his review of the manuscript.

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